

About a sibling species of *Mitrella minor* (Scacchi, 1836)

Sobre una especie gemela de *Mitrella minor* (Scacchi, 1836)

Franck BOYER* and Emilio ROLÁN**

Recibido el 1-XI-2004. Aceptado el 6-X-2005

RESUMEN

Se revisa *Columbella minor* Scacchi, 1836 en el género *Mitrella* Risso, 1826, basándose en la figura y descripción original, así como en el estudio de material del Mediterráneo y Atlántico próximo. Se designa un neotipo de *C. minor*. Este taxon tiene prioridad sobre el nombre más antiguo *Mangelia vitrea* Risso, 1826 siguiendo el artículo 23.9 de el Código de Nomenclatura Zoológica. Se discuten la variabilidad en la morfología y decoración de la concha y el cromatismo del animal.

Una especie gemela, que se extiende desde la Isla de Alborán al norte de Senegal, se describe como *Mitrella hernandesi* spec. nov. Su diagnosis está ligada en primer lugar a una protoconcha grande y pupoide en vez de la castaña y puntiaguda de *M. minor*, y en un periostraco ténue pero con un aspecto enrejado, en vez del fuerte y toscamente arrugado presente en *M. minor*.

ABSTRACT

Columbella minor Scacchi, 1836 is revised in the genus *Mitrella* Risso, 1826, on the basis of its original description and figure, and of the study of shell material from Mediterranean and the nearby Atlantic. A neotype of *C. minor* is designated. *C. minor* takes priority on the older name *Mangelia vitrea* Risso, 1826 on the basis of the article 23.9 of the Code of Zoological Nomenclature. The variability of the shell morphology, of the shell decoration and of the animal chromatism is discussed.

A sibling species ranging from Alboran Island to Northern Senegal is described as *Mitrella hernandesi* sp. nov. Its principal diagnostic features lie in a large white pupoid protoconch instead of a small brown pointed one in *M. minor*, and in a thin lattice-patterned periostracum instead of a thick coarsely wrinkled one in *M. minor*.

KEY WORDS: Columbellidae, *Mitrella*, *Columbellopsis*, sibling species, Mediterranean, Lusitanian Province, Northwest Africa.

PALABRAS CLAVE: Columbellidae, *Mitrella*, *Columbellopsis*, especies gemelas, Mediterráneo, Lusitanica Provincia, África del noroeste.

INTRODUCTION

The species currently named in the literature as *Mitrella minor* (Scacchi, 1836) is known to be one of the most common and widespread of the columbellid

species from the Lusitanian Province (LUQUE, 1986a; POPPE AND GOTO, 1991).

The species is said to range at lower infralittoral and at circalittoral levels

* 110, Chemin du Marais du Souci, 93270 Sevran, France.

** Museo de Historia Natural, Campus Universitario Sur, 15782 Santiago de Compostela, Spain.

along the Mediterranean Sea (HIDALGO, 1917), the Atlantic side of the Iberian Peninsula (NOBRE, 1940; ROLÁN, 1983) and the Canary Islands (NORDSIECK AND GARCIA-TALAVERA, 1979 as *M. svelta* Kobelt, 1901; HERNÁNDEZ-OTERO AND HERNÁNDEZ GARCÍA, 2003). Currently placed in the genus *Mitrella*, Risso, 1826 [Type species by subsequent designation (COX, 1927: 28) *Mitrella flaminea* Risso, 1826 = *Mitrella scripta* (Linnaeus, 1758)], *Columbella minor* Scacchi is the type species of the genus *Columbellopsis* Bucquoy, Dautzenberg and Dollfus, 1882 (original designation).

LUQUE (1986a) noted that the populations of *M. minor* ranging off the Canary Islands present a rich shell decoration of small light dots on a dark chestnut ground and of darker subsutural marks, to be compared with the uniform horny brown background found in the populations from Mediterranean and from the nearby Atlantic (range extension said to lie from Mogador to Vigo). LUQUE (1986a) also recorded the occurrence of a pinkish aperture with white labial denticles and of about 10 striae on the base of the last whorl in the populations from the Canary Islands, to be compared with the whitish aperture and the 12-14 striae found in the northern populations. Due to the very limited amount of shells checked from the Canary Islands (1 from La Palma and 2 from Tenerife), LUQUE (1986a) said to be unable to confirm the specific identity of the Canarian population.

The study of a large material from the whole Lusitanian Province allows us to state on the distinct specific identity

of the Canarian morph, and to describe it as a new species.

MATERIAL AND METHODS

The shells studied come principally from the MNHN collections and from the private collections of S. Gori, J. M. Hernández, P. Micali, C. Mifsud, A. Peñas and F. Swinnen. Live animals have been studied from Vigo, Algeciras and Gran Canaria.

The term of "sibling species" is used in its trivial meaning of "very similar species" (KNOWLTON, 1993).

Abbreviations:

- AMNH American Museum of Natural History, New York
- MNCN Museo Nacional de Ciencias Naturales, Madrid
- MNHN Muséum national d'Histoire naturelle, Paris
- MNHST Museo de la Naturaleza y el Hombre, Santa Cruz de Tenerife
- NHM The Natural History Museum, London
- ZSM Zoologische Staatssammlung München, Munich
- CAL collection A. Locard (MNHN)
- CAP collection A. Peñas
- CCM collection C. Mifsud
- CER collection E. Rolán
- CFB collection F. Boyer
- CFS collection F. Swinnen
- CJH collection J. Hernández
- CPM collection P. Micali
- CSG collection S. Gori
- s shell
- sp specimen
- stn station

TAXONOMY

Genus *Mitrella* Risso, 1826.

Type species by subsequent designation (Cox, 1927): *Mitrella flaminea* Risso, 1826 [= *Mitrella scripta* (Linné, 1758)].

Mitrella minor (Scacchi, 1836) (Figs. 1-7, 13, 18-24, 29-31, 38, 42, 43)

Mangelia vitrea Risso, 1826. *Hist. Nat. Eur. Mérid.*: p. 222-223, no fig.



Figures 1-3. *Mangelia vitrea*. 1, 2: holotype, L = 8.6 mm (MNHN); 3: protoconch of the holotype.
Figuras 1-3. *Mangelia vitrea*. 1, 2: holotipo, L = 8,6 mm (MNHN); 3: protoconcha del holotipo.

Buccinum politum Cantraine, 1835, non-(Lamarck, 1822) nec-(Basterot, 1825). *Bull. Ac. Roy. Sci. Bruxelles*, 11: 17, no fig.

Columbella minor Scacchi, 1836. *Catal. Conchy. regni Neapolitani.*: p. 10, fig. 11.

Buccinum scacchi Calcara, 1840. *Monog. dei Gen. Claus. e Bulim.*: p. 51, no fig.

Type material: The original type material of *Columbella minor* Scacchi is lost, destroyed in Napoli during the Second World War (CRETELLA, CROVATO, CROVATO, FASULO AND TOSCANO, 2005).

A specimen from "Punta Pagliarolo, Salerno, 35 m" (Fig. 21), from the collection J. Hernández, originating from the vicinity of Napoli and matching the original description of the species in all respects, including the reticulated colour pattern of the shell, is designated as neotype of *Mitrella minor*. The shell measurements are 9.47 × 3.68 mm. This neotype is deposited in MNHN.

Other material examined: A supposed syntype of *Mangelia vitrea* Risso, 1826 (MNHN), 8.6 × 3 mm (Figs. 1-3), assumed to originate from the coasts of the French Riviera.

Mediterranean: 1 s, Ras il Wata, Malta, 80-100 m (CFS); 3 sp, Ras il Raheb, Malta, 120 m (CFS); 15 sp, Gnejja Bay, Malta, 130 m (CCM) (Figs. 31, 42, 43); 1 sp, 3 s, Siracusa, Sicily, 100 m (CJH) (Figs. 24, 30); 1 s, Siracusa, 35 m (CFS); 2 s, Capo Asporano, Sicily (CFS); 32 s, Villaggio Pace, Messina, 10-30 m (CPM) (Fig. 22); 2 sp, Punta Faro, Messina, 30 m (CPM); 2 sp, Scilla, Messina, 50-70 m (CPM) (Fig. 20); 1 sp, Capo S. Alessio, 7-8 m (CFS); 1 s, Sowona (CFS); 2 s, Boccodasse, (CFS); 1 s, Infreschi, Marina di Camerota, 30 m, (CPM); 3 s, Ponza Island, South Thyrrenian, 600 m (CPM); 2 s, Capri (CAL, MNHN); 3 s, Secca Murelle, Latium, 23-27 m (CPM); 6 sp, Vada, Leghorn, 80-120 m (CSG); 2 s, Ajaccio, Corsica (CAL, MNHN) (Fig. 23); 2 s, St Raphael (CAL, MNHN); 2 s, St Tropez (CAL, MNHN); 2 s, Toulon (CAL, MNHN); 2 s, Bandol (CAL, MNHN); 2 s, Le Grau du Roi (CAL, MNHN); 1 s, Oran (CAL, MNHN); 45 s, Vilassar del Mar, 20-60 m (CAP); 1 s, Puerto de Solles, Mallorca, 90 m (CFS); 1 s, Calahonda (Málaga), beach (MNHN); 3 s, Málaga (CAP); 6 s, Rincón de la Victoria, Málaga, 20-40 m (MNHN); 6 s, Málaga, paseo marítimo, 20-40 m (MNHN); 2 sp, Torreguardiario, Sotogrande nets, circalittoral, (MNHN); 3 sp, Marbella, nets (MNHN); 3 s, Marbella, 30-40 m (CFB); 7 s, Marbella, beach (MNHN); 3 sp, Marbella, 70-80 m (CJH) (Figs. 4, 7, 13, 18, 19, 29, 38); 3 sp, Algeciras, La Línea, 18-22 m (CFB); 2 sp, M'diq, Northern Morocco, nets (MNHN); 21 s, Ceuta, beach in the harbour (MNHN); 2 s, Ceuta South, Anse Almadrabe, 35° 52.5' N, 05° 10.0' W, 35-45 m (MNHN); 1 sp, Ceuta, 35° 53' N, 05° 17'-05° 19' W, 50 m (MNHN); 4 s, Ceuta North,

Playa Benitez, 35° 54.6' N, 05° 20.0' W, 15-25 m (MNHN); 1 sp, Ceuta Restinga (CJH); 6 s, Alborán Island, 60-250 m (MNCN).

North East Atlantic: 1 s Tanger, market (MNHN); 4 s Tanger, beach (MNHN); 1 s, Cap Spartel, North Morocco, 100 m (MNHN); 5 sp, Algarve, Burgau, 37° 03.4' N, 08° 46.30' W, 35 m (MNHN); 4 s, Tavira, Pedro do Barril, 25 m (MNHN); 2 sp, Algarve, Baía Belixe, 37° 00.0' N, 08° 58.0' W, 23 m (MNHN); 10 sp, 5 juv, Algarve, between Salema and Praia de Luz, 70 m (MNHN); 1 sp, Algarve, between Sagres and Faro, 40-50 m (MNHN); 2 sp Algarve, Porto de Sagres, 37° 00.6' N, 08° 55.6' W, 9-15 m (MNHN); 1 juv, Algarve, Sagres, Punta Balecira, 17-23 m (MNHN); 2 s, Lagos, Portugal (CFS); 8 s, Ria de Vigo, 30-40 m (CER) (Figs. 5, 6); 1 s, Bouzas, Vigo, 20 m (CER); 32 sp, Cambados, Ría de Arousa, Galicia (collection J. Horro); 2 sp, Dakhla, Western Sahara, 50-60 m (CFB).

Type locality: Gulf of Napoli.

Original descriptions: In RISSO (1826), as *Mangelia vitrea*: "584. *M. vitrea* (N.), *M. vitrée*. *M. Testa glaberrima, nitidissima, vitrea; apertura lucida*. Coq. très lisse, fort luisante, vitrée; à ouverture translucide. Long. 0.010. Séj. Régions coralligènes. App. printemps".

No original figure. Supposed syntype MNHN in Figures 1-3.

In SCACCHI (1836), as *Columbella minor*: "*Columbella... minor Nobis* (12).

Testa parva, laevi, albo-flavescente, lineolis fulvis obsolete reticula; anfractibus octo, ultimo in medio pallidior; in speciminibus perfectis epidermide flavescente per lungum striata oblecta; columella oblique striata, ultra labrum parum porrecta; labro crassiusculo interne denticulato. Alta lin: 4. Columbellae flamine ac similis, sed minor, gracilior, et columella productiore. In sinu Neapolitano rara, et Inarimes insulae fossilis. Inspice fig. 11".

Original type material lost. Neotype MNHN in Figure 21.

Complementary description: Illustrations in ROLÁN (1983), LUQUE (1986a), POPPE AND GOTO (1991) and GIANNUZZI-SAVELLI, PULSATI, PALMERI AND EBREO (2003).

The pointed brown protoconch (Figs. 3, 7, 18, 19, 29-31, 38) does not show an evident separation from the teleoconch, but under magnification it is suggested to have 1.75 whorls, and the diameter of the nucleus is about 260-320 µm. The "nucleus width/base width ratio" of the protoconch is of about 1/2. A more or less depressed zone lies below the beginning of the nucleus, as clearly visible in Figure 31. In few cases, the protoconch is rather bulbous (Figs. 23, 24) instead of pointed, and/or

whitish (Fig. 23) instead of brown. Even the protoconch displayed in Fig. 23, assumed to result from a teratologic event, holds a "nucleus width/base width ratio" of 1/2.

The very high spire shows generally straight or very faintly concave sides and more or less turriculated whorls. The shape of the aperture is somewhat variable, from rectangular to losangic, often rather wide with a columellar border faintly angled, columellar folds from well-marked to absent, outer lip moderately convex to moderately angled, and siphonal canal rather short and widening. The spiral striae at the base of the last whorl range from 9 to 14, more currently being 12-13. The ground colour is creamy white to horny beige with wide tan-brown spiral bands covering most of the whorls. A lighter narrow spiral blank at the mid part of the last whorl often separates 2 wide brown zones. In few shells, mainly coming from Central and Southern Mediterranean, the brown spiral bands tend to be fragmented in brown marks making a stripped (Fig. 20), a reticulated (Figs. 21, 22) or a flamed pattern (Figs. 23, 24).

The length of the adult shells ranges from 8 mm up to 13 mm.

The periostracum is thick, with coarse spaced axial wrinkles giving a "waffle" appearance to the surface (Figs. 5, 6, 42, 43).

The colour pattern of the soft parts shows as somewhat variable. The main features are displayed by ROLÁN AND OTERO-SCHMITT (1996) after an animal from Vigo. Two animals examined from Algeciras by the first author presented



Figures 4-7. *Mitrella minor*. 4: specimen from Marbella, 70-80 m, 13 mm (CJH); 5, 6: specimens from the Ría de Vigo, 9.1 mm and 9.4 mm (CER); 7: protoconch of the specimen from Figure 4. Figures 8-11. *Mitrella hernandezi*. 8: holotype, NW Gran Canaria, 11.0 mm (MNCN); 9: paratype, 10.5 mm, (CJH); 10: specimen from off Banc d'Arguin, Mauritania, 80 m, 12.7 mm (CJH); 11: protoconch of the holotype.

Figuras 4-7. Mitrella minor. 4: ejemplar de Marbella, 70-80 m, 13 mm (CJH); 5, 6: ejemplares de la Ría de Vigo, 9,1 mm and 9,4 mm (CER); 7: protoconcha del ejemplar de la Figura 4. Figuras 8-11. Mitrella hernandezi. 8: holotipo, NW Gran Canaria, 11,0 mm (MNCN); 9: paratipo, 10,5 mm, (CJH); 10: ejemplar del Banc d'Arguin, Mauritania, 80 m, 12,7 mm (CJH); 11: protoconcha del holotipo.

the same general pattern: underside and periphery of the sole whitish, column of the foot shaded on its sides by large blackish zones on a whitish grey ground, front zone whitish grey, back zone blackish; head, top of the neck and tentacles black, except around the eyes, the underside and the tip of the tentacles which are whitish; siphon blackish, all the whitish or whitish grey zones being flecked by deep white tiny dots. The operculum is hyalinous yellow.

The radula is summarized in LUQUE (1986a, pl. 3, fig. f).

Distribution: The whole Mediterranean and the nearby Atlantic from the Strait of Gibraltar to Galicia. Live specimens from 7 m to 130 m. The occurrence along the Atlantic coasts of the Northern Morocco is probable, but it remains to be fully documented. The occurrence off Western Sahara remains dubious, as only one record is known from this area (2 sp, Dakhla, CFB), possibly coming from accidental mixing of shells from Mediterranean and from Western Sahara. Not represented in the Canary Islands.

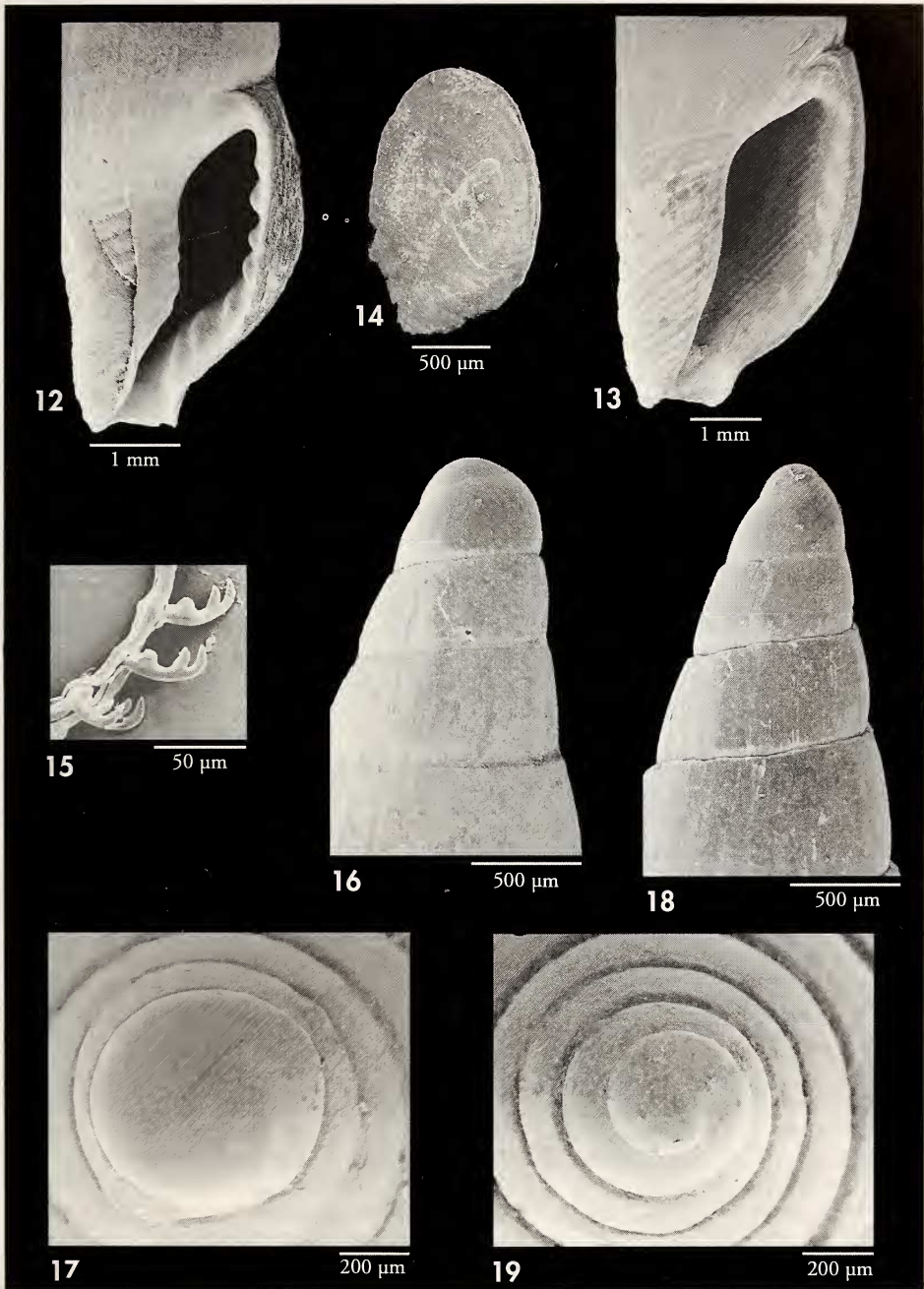
Remarks: VAN AARTSEN, MENKHORST AND GITTENBERGER (1984: 80) noted that *Columbellopsis* has been considered later by its authors as falling in synonymy with *Atilia* H. and A. Adams, 1853, and they claimed that the "poorly known boundaries between species in this group" did not allow "to place *M. minor* in a subgenus of its own".

VAN AARTSEN ET AL. (1984) did not care with the arguments displayed by RADWIN (1978: 331-332), who shows that the designation of *Mitrella minor* Scacchi as type species of *Atilia* was invalid, that the species has been removed from *Atilia* by the next reviewer and that *Columbellopsis* can be used as brother genus of *Mitrella* in the present state, being represented by its own peculiar shell features besides *Mitrella* as far back as the early Eocene. These consistent arguments will be to take in consideration in a taxonomic revision of the eclectic genus *Mitrella*, but the matter requires a general analysis of the phylogeny prevailing about the different

species group currently lumped within *Mitrella* s.l. In the wait of such a revision, we feel more appropriate to keep conservatively *Columbella minor* in the genus *Mitrella*.

Despite its status of ubiquitous species, few synonyms occurred and the specific name of *C. minor* prevailed in the literature since the Scacchi's description. *Buccinum politum* Cantraine, 1835, which is a preoccupied name, was proved to be a nomen dubium by VAN AARTSEN ET AL. (1984), *Buccinum minus* Philippi, 1836 was a misspelling of the Scacchi's name, and *Buccinum scacchi* Calcara, 1840 was apparently the last name proposed as referring to the species. CALCARA (1845: 40) considered apparently its *Buccinum scacchi* Calcara, 1840 as synonym of *Columbella minor* Scacchi, 1836.

The elusive name of *Mangelia vitrea* Risso, 1826, neglected in the literature due both to its deceitful original generic attribution and to its poorly descriptive original definition, is considered herein as an objective older synonym of *C. minor*, on the ground of the supposed syntype stored in MNHN. We must express however some reserves about the status of this syntype and about the identity of the taxon *Mangelia vitrea*. These reserves lie first in the fact that ARNAUD (1977) did not recognize any material referring to *M. vitrea* in MNHN at the time of his study (type said to be lost), and that the subsequent determination of the so-said syntype of *M. vitrea* was made by the MNHN curator on the basis of a label from the hand of A. Risso ("*Mangelia vitrea* Risso") joined to the supposed syntype but without further correlation between this label and the shell specimen. Secondly, the figure of *M. vitrea* pictured by P. Gény in ARNAUD (1977: pl. 11, fig. 201) and supposed to represent a shell labelled under this name in the Risso's collection, does not match really the shell morphology of the supposed MNHN syntype. The figure given by P. Gény presents a shell with a narrower, more slender and more acute spire, and a longer siphonal canal with a well-marked notch, the general



Figures 12, 14-17. *Mitrella hernandezi*, paratype (CER). 12: detail of the aperture; 14: operculum; 15: radula; 16, 17: protoconch of the shell from Fig. 12. Figures 13, 18, 19. *Mitrella minor*, specimen from Marbella, 70-80 m, (CJH). 13: detail of the aperture; 18, 19: protoconch of the shell from Figure 13.

Figuras 12, 14-17. *Mitrella hernandezi*, paratipo (CER). 12: detalle de la abertura; 14: opérculo; 15: rádula; 16, 17: protoconcha de la concha de la Fig. 12. Figuras 13, 18, 19. *Mitrella minor*, ejemplar de Marbella, 70-80 m (CJH). 13: detalle de la abertura; 18, 19: protoconcha de la concha de la Figura 13.

outline suggesting a turrid species. On the other hand, the poor original description of *M. vitrea* matches more closely the supposed MNHN syntype than any turrid species from Mediterranean known to us. Any of these arguments does not allow by itself to define *M. vitrea* as a dubious species.

The junior name *Columbella minor* Scacchi, 1836 is considered to have priority on the older name *Mangelia vitrea* Risso, 1826 on the ground of the article 23.9 of the Code of Zoological Nomenclature (Precedence Inversion): *M. vitrea* (probably considered as a nomen dubium by the subsequent authors) was apparently not used in the literature after 1899, and *C. minor* was used in more than 25 works (generally under the genus *Mitrella*), published by more than 10 authors during the last 50 years along a period of more than 10 years. References and the pages where the species was mentioned are the following: PASTEUR-HUMBERT (1962: 159), NORDSIECK (1968: 124), PARENZAN (1970: 171), SCHIRÒ (1979: 7), SABELLI AND SPADA (1981: 1), TERRENI (1981: 35), ROLÁN (1983: 248), VAN AARTSEN *ET AL.* (1984: 37), BRUSCHI, CEPPODOMO, GALLI AND PIANI (1985: 25), LUQUE (1986a: 234), LUQUE (1986b: 91), CASTAÑO, CIVIS AND GONZÁLEZ DELGADO (1988: 178), SABELLI, GIANNUZZI-SAVELLI AND BEDULLI (1990: 206), POPPE AND GOTO (1991: 152), ARDUINO, LOCATELLI, ORLANDO AND REPETTO (1995: 82), ROLÁN AND OTERO SCHMITT (1996: 100), GIRIBET AND PEÑAS (1997: 52), MACEDO, MACEDO AND BORGES (1999: 204), ARDOVINI AND COSSIGNANI (1999: 62), BOUCHET, LE RENARD AND GOFAS (2001: 194), GIANNUZZI-SAVELLI *ET AL.* (2003: 256), HERNÁNDEZ-OTERO AND HERNÁNDEZ GARCÍA (2003: 84), ÖZTURK, BUZZURO AND AVNI BENLI (2004: 58), ARDOVINI AND COSSIGNANI (2004: 166), POGGIANI, MATTIOLI AND MICALI (2004: 116), and CRETTELLA *ET AL.* (2005: 120).

This solution is proposed for the benefit of the stability of the nomenclature.

Mitrella minor does not show evident geographic forms. However, the speci-

mens from Vigo (Figs. 5, 6) have smaller and darker shells than those from Mediterranean, and they seem to have a more prominent periostracum (compare with a specimen from Malta in Figures 42 and 43). The populations from the coasts of Portugal and Spain, also those from Southern France and from the Italian Liguria, mainly show a uniform tan-brown shell colour pattern, sometimes dull creamy-white, whereas the populations from Central and Southern Mediterranean (Corsica, Western Italy from Toscana to Sicily, North Africa coasts) present most frequently a "flamed", "reticulated" or "slack check-patterned" shell decoration (from the words of SCACCHI, 1836), corresponding to the original description of *M. minor*. A white vitreous to hyalinous form with brownish to greyish protoconchs, which matches the original description of *Mangelia vitrea* (original locality belonging probably to the French Riviera), seems also to be more frequent in Central Mediterranean [specimens observed from Leghorn (CSG) and from Siracusa (CJH)]. Full tan-brown shells and intergrades are also found off Western Italy, and full tan-brown shells are found off Malta.

The noticeable variations in the protoconch morphology and background colour pictured herein (Figs. 3, 7, 18, 19, 29-31, 38) do not correlate with the variations observed in the morphology and in the decoration of the shells (Figs. 1, 2, 4-6, 13, 20-24, 42). One shell from Ajaccio, Corsica (Fig. 23) is comparable to the following species for its whitish bulbous protoconch, but it is provisionally named as *M. cf. minor*, due to the fact that this protoconch seems to result from a teratologic event rather than to express a distinctive specific feature. The wide aperture and the colour pattern of broad flames occurring in the shell pictured in Figure 23 are coherent with the variability observed in *M. minor*, but not with the variability observed in the following species. Further inquiries will verify if the distribution of the following species reaches Corsica and if the shell pictured in Figure 23 really belongs to *M. minor*.



Figures 20-22, 24. *Mitrella minor*. 20: specimen from Scilla, Messina, 50-70 m, 10.8 mm (CPM); 21: neotipo, ejemplar de Punta Pagliarolo, Salerno, 35 m, 9.47 mm (MNHN, ex-CJH); 22: concha de Villaggio Pace, Messina, 10-30 m, 9.5 mm (CPM); 24: ejemplar de Siracusa, Sicilia, 100 m, 8.5 mm (CJH). Figura 23. *Mitrella cf. minor*, concha de Ajaccio, Corsica, 11 mm (MNHN). Figures 25-28. *Mitrella hernandezii*. 25: ejemplar de la isla de Alborán, 20 m, 9.8 mm (CJH); 26: ejemplar de la isla de Alborán, 20 m, 10.2 mm (CJH); 27: ejemplar de la isla de Alborán, 20 m, 9.25 mm (CJH); 28: ejemplar de La Manchita, NO Gran Canaria, 35 m, 9.5 mm (CJH).
 Figuras 20-22, 24. *Mitrella minor*. 20: ejemplar de Scilla, Messina, 50-70 m, 10.8 mm (CPM); 21: neotipo, ejemplar de Punta Pagliarolo, Salerno, 35 m, 9.47 mm (MNHN, ex-CJH); 22: concha de Villaggio Pace, Messina, 10-30 m, 9.5 mm (CPM); 24: ejemplar de Siracusa, Sicilia, 100 m, 8.5 mm (CJH). Figura 23. *Mitrella cf. minor*, concha de Ajaccio, Corsica, 11 mm (MNHN). Figuras 25-28. *Mitrella hernandezii*. 25: ejemplar de la isla de Alborán, 20 m, 9.8 mm (CJH); 26: ejemplar de la isla de Alborán, 20 m, 10.2 mm (CJH); 27: ejemplar de la isla de Alborán, 20 m, 9.25 mm (CJH); 28: ejemplar de La Manchita, NO Gran Canaria, 35 m, 9.5 mm (CJH).

Mitrella hernandezii sp. nov. (Figs. 8-12, 14-17, 25-28, 32-37, 39-41)

Type material: Holotype (Figs. 8, 11) in MNCN (15.05/46626); paratypes in AMNH (1), NHM (1), MNHN (1), ZSM (1), MNHST (1), CJH (20) (Fig. 9), CER (2) (Figs 12, 14-17), CFB (2), all from the type locality.

Other material examined: Mediterranean: 5 sp, Alborán Island, 20 m (CJH) (Figs. 25-27, 32-34).

Canary Islands: 2 s, Gran Canaria (CJH); 43 s, off NW Gran Canaria, 170 m, (CJH); 24 sp, Barranco de Guayedra, NW Gran Canaria (CJH); 2 s, NW Gran Canaria, 150 m (CJH) (Figs. 35, 36); 2 s, Gran Canaria (CJH); 4 sp, NW Gran Canaria, 302 m (CJH); 8 s, La Manchita, Gran Canaria, 35 m (CJH) (Fig. 28); 5 sp, NW Gran Canaria, 150-200 m (CFB); 5 s, off Las Nieves, NW Gran Canaria, 34 m (CFB); 1 s off San Cristobal, NE Gran Canaria, 40-60 m (CJH).

Northwest Africa: 3 s, south of Cape Bojador, 25° 40' N, 15° 03' 4 W, 100 m (CSG); 1 s, Western Sahara (CFS); 1 sp, Western Sahara, 30 m (CJH); 6 sp, Western Sahara, 30-40 m (CJH); 10 sp, Western Sahara, 60 m (CJH) (Figs. 37, 39-41); 2 sp, Western Sahara, 40 m (CJH); 15 sp, 2 s, Western Sahara, 30 m (CJH); 6 s, Western Sahara, 60 m (CJH); 1 s, 22° 00' N, 17° 22' W (CJH); 2 sp, Dakhla, Western Sahara, 50-60 m (CFB); 5 sp, Western Sahara, 30-40 m (CFB); 3 s, Western Sahara, 50-60 m (CFB); 1 s, Meteor stn 36, 21° 19.5' N, 17° 13.1' W, 58 m (ZSM); 1 sp, 9 s, off Banc d'Arguin, Mauritania, 80 m (CJH) (Fig. 10); 1 s, Lompoul, Northern Senegal, 150 m (CFB); 1 s, Meteor stn 60.77, 17° 17' N, 16° 30' W, 85 m (MNHN); 1 s, NO "N'Diogo" 1981 stn 119, 18° 36' N, 16° 28' W, 70 m (MNHN); 1 s, NO "N'Diogo" 1981 stn 103, 18° 48' N, 16° 22' W, 28 m (MNHN); 1 s, NO "N'Diogo" 1981 stn 248, 17° 54' N, 16° 20' W, 76 m (MNHN); 1 s, NO "N'Diogo" 1981 stn 232, 17° 42' N, 16° 05' W, 12 m (MNHN); 1 s, Dakar harbour, 11-12 m (MNHN); 1 s, NO "N'Diogo" 1981, stn 240, 17° 48' N, 16° 24' W, 38 m (MNHN); 1 s, region of Dakar, 14° 19' N, 17° 32' W, 132 m (MNHN); 1 sp, 14 s, region of Dakar, 14° 24' N, 17° 23' W, 78 m (MNHN); 1 s, Dakar, 14° 51' N, 17° 30' W, 165-180 m (MNHN); 1 s, Dakar, 14° 52' N, 17° 30' W, 140-150 m (MNHN); 2 s, NO "N'Diogo" 1981 stn 63, 20° 42' N, 17° 21' W, 43 m (MNHN); 1 s, 1 fragment, region of Dakar, 20° 58' N, 17° 37' W, 110 m (MNHN); 8 s, South of Gorée, 48-50 m (MNHN); 1 s, South of Gorée, 95-98 m (MNHN).

Type locality: Off Northwest Gran Canaria, 50-170 m.

Etymology: The specific name is dedicated to José María Hernández, Canarian malacologist devoting to the study of the molluscan fauna from the Southern Lusitanian Province.

Description: The shell (Figs. 8-10) is solid, smooth, lanceolate with an elongate spire. The whitish protoconch (Fig. 11) is large, pupoid and smooth. No clear separation with the teleoconch occurs, but under magnification it appears to be made of one whorl reaching about 750 µm of diameter at the base and of a wide bulbous nucleus of about 500 µm. The spire has about 5 smooth flat whorls, an evident incised suture without subsutural step and its sides show a slightly concave outline. There are about eleven spiral striae occur at the base of the body whorl. The aperture is small, subtriangular, comma-shaped, and it is continued with a sinuous siphonal canal relatively long and narrow for the genus. The columella bears 5 scarcely evident teeth. The columellar callus is slightly extended externally, convex and moderately prominent. Seven well marked labial teeth occur inside the aperture and are pro-

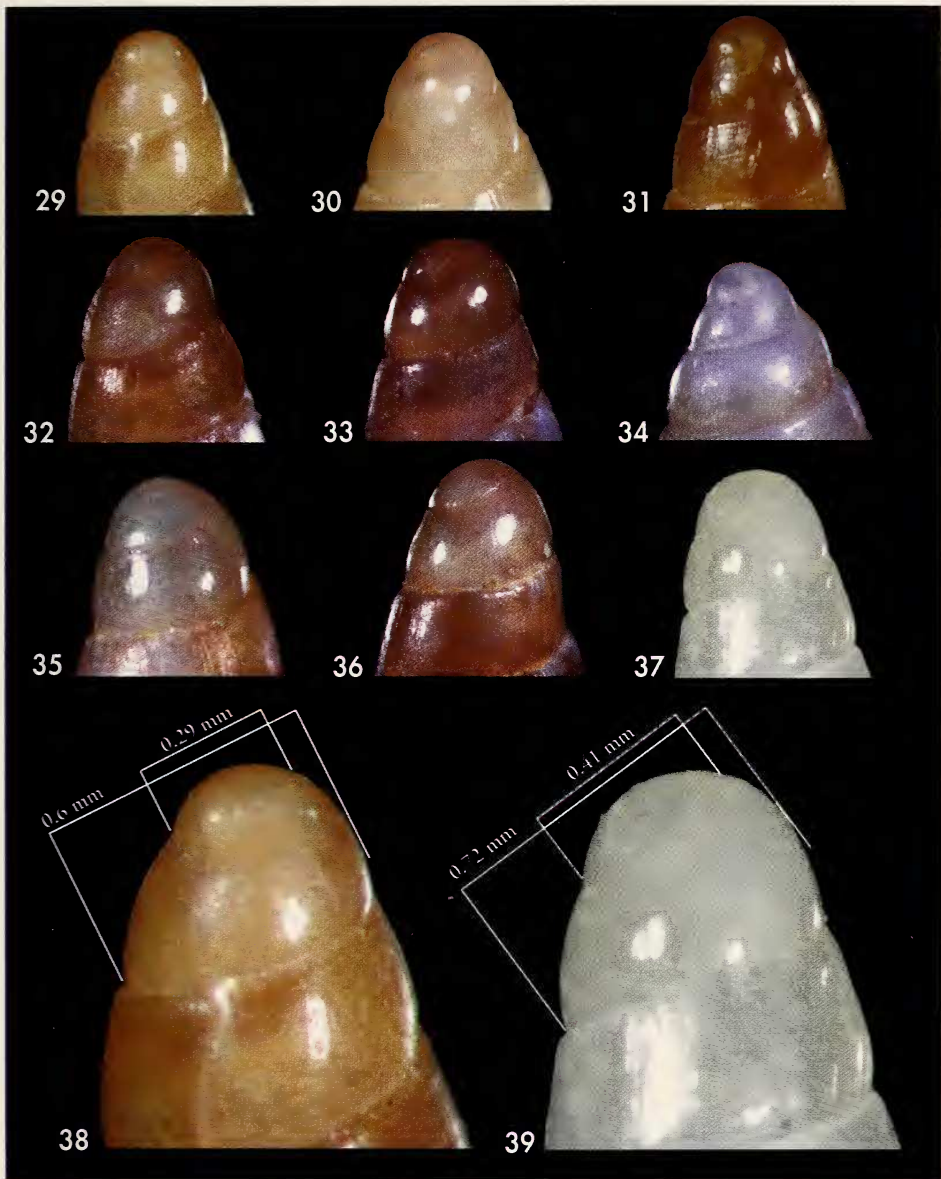
longed internally as lirae. The outer lip has a wide external thickening.

The colour pattern is light honey brown with numerous small ovoid white dots all over the shell; a discontinuous suprasutural line is formed by dark brown spots alternating with lighter ones, a similar subsutural line is formed by longer, larger and more spaced out dark brown dashes.

The lattice-patterned periostracum (Figs. 40, 41) is very thin.

Dimensions: The holotype (Fig. 8) is 11.0 x 3.8 mm. Some shells reach up to 13 mm length.

Headfoot: Some specimens have been observed alive from Northwest Gran Canaria, dredged at 50 m. The headfoot shows a creamy-white background with brown-violet dashes and stains, the siphon showing also small yellow spots. The distal parts are white, like are the lateral sides of the foot and a line bordering the propodium and the opercu-



Figures 29-31, 38. *Mitrella minor*, protoconchs. 29: specimen from Marbella, 70-80 m (CJH); 30: specimen from Siracusa, 100 m, (CJH); 31: specimen from Gnejja Bay, Malta (CCM); 38: same as Figure 29. Figuras 32-37, 39. *Mitrella hernandezii*, protoconchs. 32: specimen from Alboran Island, 20 m (CJH); 33: specimen from Alboran Island, 20 m, (CJH); 34: specimen from Alboran Island, 20 m (CJH); 35: specimen from NW Gran Canaria, 150 m (CJH); 36: specimen from NW Gran Canaria, 150 m (CJH); 37: specimen from Western Sahara, 60 m (CJH); 39: same as Figure 37. Figuras 29-31, 38. *Mitrella minor*, protoconchas. 29: ejemplar de Marbella, 70-80 m (CJH); 30: ejemplar de Siracusa, 100 m, (CJH); 31: ejemplar de Gnejja Bay, Malta (CCM); 38: el mismo que la Figura 29. Figuras 32-37, 39. *Mitrella hernandezii*, protoconchas. 32: ejemplar de la isla de Alborán, 20 m (CJH); 33: ejemplar de la isla de Alborán, 20 m, (CJH); 34: ejemplar de la isla de Alborán, 20 m (CJH); 35: ejemplar del NO de Gran Canaria, 150 m (CJH); 36: ejemplar del NO de Gran Canaria, 150 m (CJH); 37: ejemplar de Sahara Occidental, 60 m (CJH); 39: el mismo que la Figura 37.

lum area. A live animal is pictured in HERNÁNDEZ AND BOYER (2005).

The operculum (Fig. 14) is ovoid with a terminal nucleus and an insertion mark divided in two parts by a strong wrinkle.

Radula: Typical of the genus, with a rectangular rachidian tooth and two stretched marginal teeth bearing one bulbous cusp near to the base and two hooked cusps along the distal side (Fig. 15).

Distribution: From Alborán Island to Northern Senegal, live specimens from 20 to 300 m.

Remarks: The protoconch shows about 1.75 whorl, and the "nucleus width/base width ratio" is of about $2/3$ (Figs. 16, 17, 32, 33, 35-37, 39), except in the case of one specimen from Alborán Island (Fig. 34) which has a greyish pointed protoconch with a ratio closer to $1/2$. However, all the other shell features of this specimen reach the common features of *Mitrella hernandezi* sp. nov. and its protoconch is assumed to result from a teratologic event (low stepped apex differing noticeably from the pointed apex of *M. minor*). A depressed zone under the nucleus is sometimes evident in the protoconch of *M. hernandezi* (Figs. 32, 33), but it is often faint or lacking (Figs. 34-37). The striae at the base of the last whorl count 9 to 16, being more often 10-11. The columellar teeth count 5 to 7. For the other morphologic features of its shell, like for its colour pattern, *M. hernandezi* is very constant all along its wide range of distribution.

Some populations of *M. hernandezi* from Western Sahara show a very light and attenuated shell colour decoration. In any case they show the fine suprasutural and subsutural interrupted lines mentioned in the description. Few shells from Gran Canaria may show a pupoid light brown protoconch instead of whitish as usual (CFB).

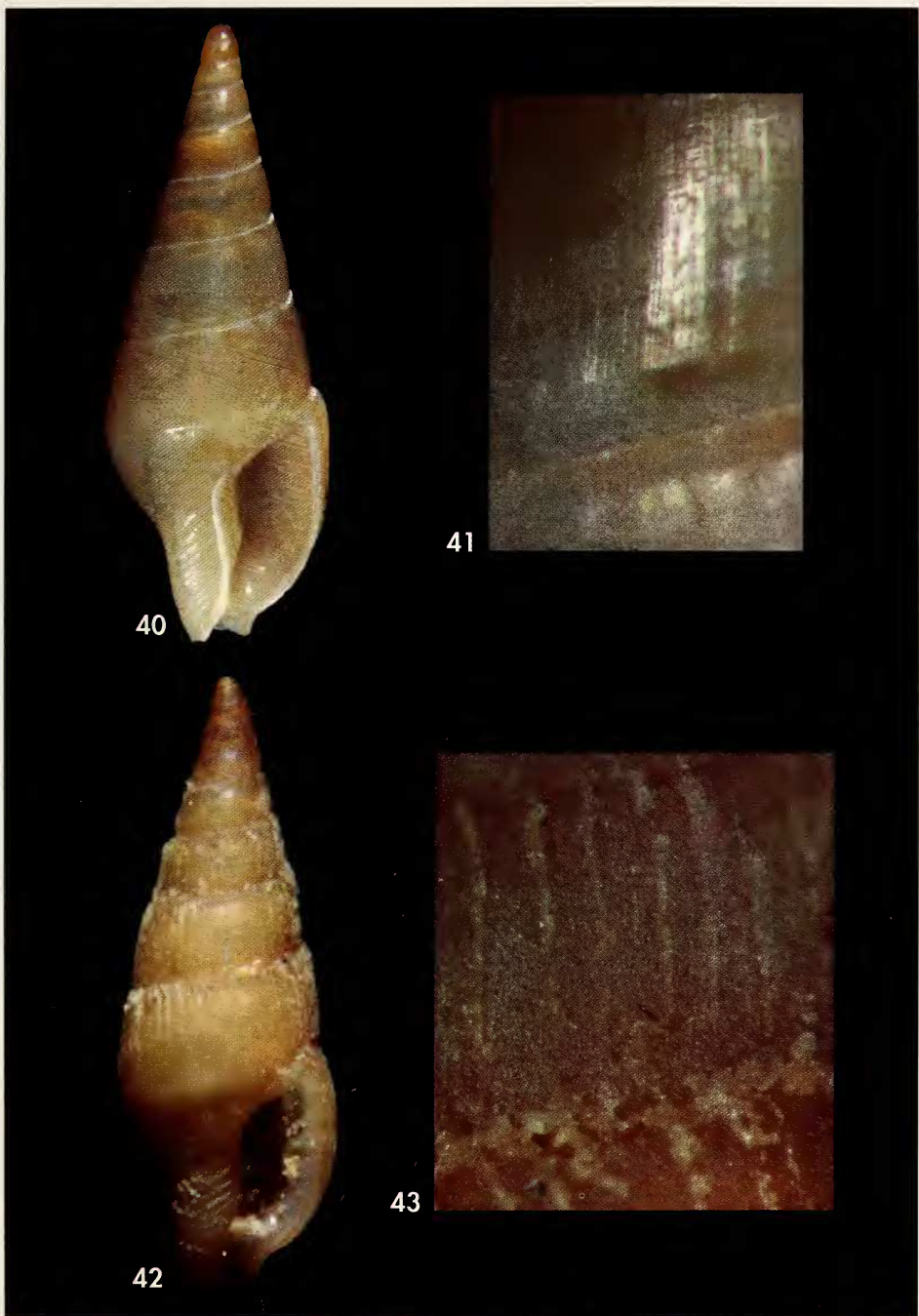
NORDSIECK AND GARCIA-TALAVERA (1979) mentioned and illustrated our new species *M. hernandezi* as "*Mitrella svelta* (Monterosato) Kobelt, 1901" from the Canary Islands (La Palma) and from North Africa. In CHIARELLI, MICALI AND QUADRI (2003), *M. svelta* Kobelt, 1889 (ex

Monterosato ms) is considered to be an error *pro M. spelta* (Kobelt, 1893), which is placed in synonymy with *Mitrella lanceolata* (Locard, 1886), a species very similar to the common Mediterranean *Mitrella scripta* (Linnaeus, 1758).

M. hernandezi must be considered as a sibling species of *M. minor* ("pseudo-sibling species" according to KNOWLTON, 1993), being distinguishable principally on the basis of its strong pupoid (generally white) protoconch with a "nucleus width/base width ratio" of about $2/3$ instead of a smaller pointed (generally brown) protoconch in *M. minor* with a ratio of about $1/2$, and on the basis of its very thin lattice-patterned periostracum instead of a thick coarsely wrinkled one in *M. minor*. The shell aperture in *M. hernandezi* is more triangular, often smaller and narrower than in *M. minor*, the siphonal canal is generally longer, the outer lip more angular and the labial denticles stronger. The incised suture and the concave outline of the spire sides seem also to be specific features of *M. hernandezi*, despite the occurrence of some intergrading cases in *M. minor*. The usual shell decoration of *M. hernandezi* is characterized by a pattern of small packed white dots, which has not a real equivalent in *M. minor* (Figs. 21, 22), who presents a much more variable shell decoration.

Albeit the average number of spiral striae at the base of the body whorl is 10-11 in *M. hernandezi* and 12-13 in *M. minor*, higher numbers of striae may occur in *M. hernandezi* and lower numbers may occur in *M. minor*. The colour design of the animal is similar in both species.

Despite the lack of data about the forms ranging off the western coasts of Morocco between Cape Spartel and Cape Juby, the record of specimens of *M. hernandezi* collected by J. M. Hernández himself off Alborán Island (CJH, 20 m) and the record from the same place of shells of *M. minor* (MNCN, 60-250 m) allow to state about the sympatry of both species at least off Alborán Island, and probably all along the western coasts of Morocco.



Figures 40, 41. *Mitrella hernandezi*, periostracum. 40: specimen from Western Sahara, 60 m, 10 mm (CJH); 41: same as Figure 40, detail. Figures 42, 43. *Mitrella minor*, periostracum. 42: specimen from Gneja Bay, Malta, 130 m, 9.7 mm (CCM); 43: same as Figure 42, detail.

Figuras 40, 41. Mitrella hernandezi, periostraco. 40: ejemplar de Sahara Occidental, 60 m, 10 mm (CJH); 41: el mismo que la Figura 40, detalle. Figuras 42, 43. Mitrella minor, periostraco. 42: ejemplar de Gneja Bay, Malta, 130 m, 9,7 mm (CCM); 43: el mismo que la Figura 42, detalle.

ACKNOWLEDGEMENTS

We are indebted to José María Hernández (Gáldar, Gran Canaria, Spain) for the loan of material, for the gift of the type specimens and for field observations. The material from Gran Canaria and from Western Sahara was collected mostly by Arcadio Benitez Galván (Agaete, Gran Canaria, Spain). Important lots of material from Mediterranean were loaned by Sandro Gori (Livorno, Italy), Pasquale Micali (Fano, Italy), Constantine Mifsud (Rabat, Malta), Anselmo Peñas (Vilanova i la Geltrú, Spain), Juan Horro (Vigo, Spain) and Frank Swinnen (Lommel, Belgium).

Special thanks are due to Virginie Héros (Muséum national d'Histoire naturelle, Paris) and to Paolo Crovato (Napoli, Italy) for kind help about type material.

The colour photos were performed by Jesús S. Troncoso (Department of Ecology of the Vigo University), Jacques Pelorce (Le Grau du Roi, France) and José María Hernández. The SEM photos were operated by Jesús Méndez in the Centro de Apoyo Científico y Tecnológico of the University of Vigo.

The typing out of the text was performed by Robert and Nicole Hasselot (Jouques, France).

BIBLIOGRAPHY

- ARDOVINI, R. AND COSSIGNANI, T., 1999. *Atlante delle conchiglie di profondità del Mediterraneo*. L'Informatore Piceno, Ancona. 111 pp.
- ARDOVINI, R. AND COSSIGNANI, T., 2004. *West African Seashells*. L'Informatore Piceno, Ancona. 316 pp.
- ARDUINO, G., LOCATELLI, B., ORLANDO, F. AND REPETTO, G., 1995. *Catálogo ilustrado delle conchiglie marine del Mediterraneo*. Amici del Museo "F. Eusebio", Alba. 173 pp.
- ARNAUD, P., 1977. Révision des taxa malacologiques méditerranéens introduits par Antoine Risso. *Annales du Muséum d'histoire naturelle de Nice*, 5: 101-150.
- BOUCHET, P., LE RENARD, J. AND GOFAS, S., 2001. Mollusca. In: Costello, M. J., Embrow, C. S. and White, R. (Eds.): *European Register of Marine Species. A check-list of the marine species in Europe and a bibliography of guides to their identification*. Patrimoines naturels, 50: 463 pp.
- BRUSCHI, A., CEPPODOMO, I., GALLI, C. AND PINANI, P., 1985. *Catálogo dei Molluschi conchiferi viventi nel Mediterraneo*. ENEA, Roma. 111 pp.
- CALCARA, P., 1845. *Cenno su i Molluschi Viventi e Fossili della Sicilia*. Stamperia Reale, Palermo, 49 p., 4 pl.
- CASTAÑO, M. J., CIVIS, J. AND GONZÁLEZ DELGADO, J. A., 1988. Los moluscos del Plioceno de la Palma del Condado y Moguer (Huelva). Aproximación paleoecológica. *Iberus*, 8 (2): 173-186.
- CHIARELLI, S., MICALI, P. AND QUADRI P., 2003 ("2002"). Note su alcune specie mediterranee del genere *Mitrella* Risso, 1826 (Gastropoda, Muricidae). *Bollettino Malacologico*, 38 (9-12): 171-183.
- CRETILLA, M., CROVATO, C., CROVATO, P., FASULO, G. AND TOSCANA, F., 2005 ("2004"). The malacological work of Arcangelo Scacchi (1810-1893). Part II: a critical review of Scacchi taxa. *Bollettino Malacologico*, 40 (9-12): 114-131.
- GIANNUZZI-SAVELLI, R., PUSATERI, F., PALMERI, A. AND EBREO, C., 2003. *Atlante delle conchiglie marine del Mediterraneo*. vol. 4. Evolver, Roma. 298 pp.
- GIRIBET, G. AND PEÑAS, A., 1997. Fauna malacológica del litoral del Garraf (NE de la Península Ibérica). *Iberus*, 15 (1): 41-93.
- HERNÁNDEZ, J. M. AND BOYER, F., 2005. Notes about the columbellid fauna from the infralittoral and circalittoral levels of the Canary Islands. *Iberus*, 23 (2): 69-93.
- HERNÁNDEZ-OTERO, J.M. AND HERNÁNDEZ GARCÍA, M., 2003. Mollusca, in: Moro, L., Martin, J. L., Garrido, M. J. and Izquierdo, I. (Eds). *Lista de especies marinas de Canarias (algas, hongos, plantas y animales)*. Consejería de Política Territorial y Medio Ambiente del Gobierno de Canarias, pp 81-104.
- HIDALGO, J. G., 1917. *Fauna malacológica de España, Portugal y las Baleares*. Museo Ciencias Naturales, Madrid. 752 pp.
- KNOWLTON, N., 1993. Sibling species in the sea. *Annual Review of Ecology and Systematics*, 24: 189-216.
- LUQUE, A. A., 1986a. El genero *Mitrella* Risso, 1826 (Gastropoda, Columbellidae) en las costas ibéricas. *Bollettino Malacologico*, 22 (9-12): 223-244.

- LUQUE, A. A., 1986b. Contribución al conocimiento de los gasterópodos de las costas de Málaga y Granada II. Prosobranchios. *Iberus*, 6 (1): 79-94.
- MACEDO, M. C. C., MACEDO M. I. C. AND BORGES, J. P., 1999. *Conchas marinhas de Portugal*. Verbo. Lisboa. 516 pp.
- NOBRE, A., 1940. *Fauna malacologica de Portugal. Moluscos marinhos e das aguas salobras*. Companhia Editora do Minho, Barcelos. 807 pp. 87 láms.
- NORDSIECK, F., 1968. *Die europaische Meeres-Gehäuseschnecken* (Prosobranchia). 2. Auflage. Gustav Fischer, Stuttgart. 539 pp.
- NORDSIECK, F. AND GARCÍA-TALAVERA, F., 1979. *Moluscos marinos de Canarias y Madera (Gastropoda)*. Aula de Cultura de Tenerife, 208 pp., 46 pls.
- ÖZTURK, B., BUZZURRO, G. AND AVNI BENLI, H., 2004 ("2003"); Marine molluscs from Cyprus: new data and checklist. *Bollettino Malacologico*, 39 (5-8): 49-78.
- PARENZAN, P., 1970. *Carta d'identità delle conchiglie del Mediterraneo. vol 1. Gasteropodi*. Bios Taras, Taranto. 283 pp.
- PASTEUR-HUMBERT, C., 1962. Les Mollusques marins testacés du Maroc. Catalogue non critique. I. Les gastéropodes. *Travaux de l'Institut Scientifique Chérifien, sér. Zool.*, 23: 1-245.
- POGGIANI, L., MATTIOLI, G. AND MICALI, P., 2004. I Molluschi marini conchiferi delle Province di Pesaro e Urbino. *Quaderni dell'Ambiente*, 17: 1-175.
- POPPE, G.T. AND GOTO, Y., 1991. *European Seashells, Vol I*. Christa Hemmen Ed., Wiesbaden, 352 pp.
- RADWIN, G. E., 1978. The family Columbelloidea in the Western Atlantic. Part II b. The Pyreninae (Continued). *The Veliger*, 20 (4): 328-344.
- RISSO, A., 1826. *Histoire naturelle des principales productions de l'Europe méridionale et principalement de celles des environs de Nice et des Alpes maritimes. 4. Mollusques: I-VII, 1-439*. Levrault, Paris.
- ROLÁN, E., 1983. Moluscos de la Ría de Vigo, I. Gasterópodos. *Thalassas*, 1 (1), Anexo 1: 1-383 pp.
- ROLÁN, E. AND OTERO SCHMITT, J., 1996. *Guía dos moluscos de Galicia*. Ediciones Galaxia, Vigo, 318 pp.
- SABELLI, B., GIANNUZZI-SAVELLI, R. AND BEDULLI, D., 1990. *Catalogo annotato dei molluschi marini del Mediterraneo. vol. 1*. Libreria Naturalistica Bolognese, Bologna. 384 pp.
- SABELLI, B. AND SPADA, G., 1981. Guide illustrata all'identificazione delle conchiglie del Mediterraneo, Fam. Columbelloidea II. Suppl. *Bollettino Malacologico*, 17 (11-12): 1-3.
- SCACCHI, A., 1836. *Catalogus Conchyliorum regni Neapolitani: 1-18, 1 pl.* Privately published, Napoli.
- SCHIRÒ, G., 1979. The genus *Mitrella* Risso, 1827 in the Mediterranean. *La Conchiglia*, 11 (120-121): 7-8.
- TERRENI, G., 1981. *Molluschi conchiferi del mare antistante la costa Toscana*. Museo di Storia Naturale, Livorno. 100 pp.
- VAN AARTSEN, J. J. VAN, MENKHORST, H. P. G. M. AND GITTEBERGER, E., 1984. The marine Mollusca of the Bay of Algeiras, Spain, with general notes on *Mitrella*, Marginelloidea and Turridae. *Basteria*, Suppl. 2: 135 pp., 394 figs.